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# THE SATSUMA ORANGE

A MONEY CROP FOR NORTH  
AND WEST FLORIDA

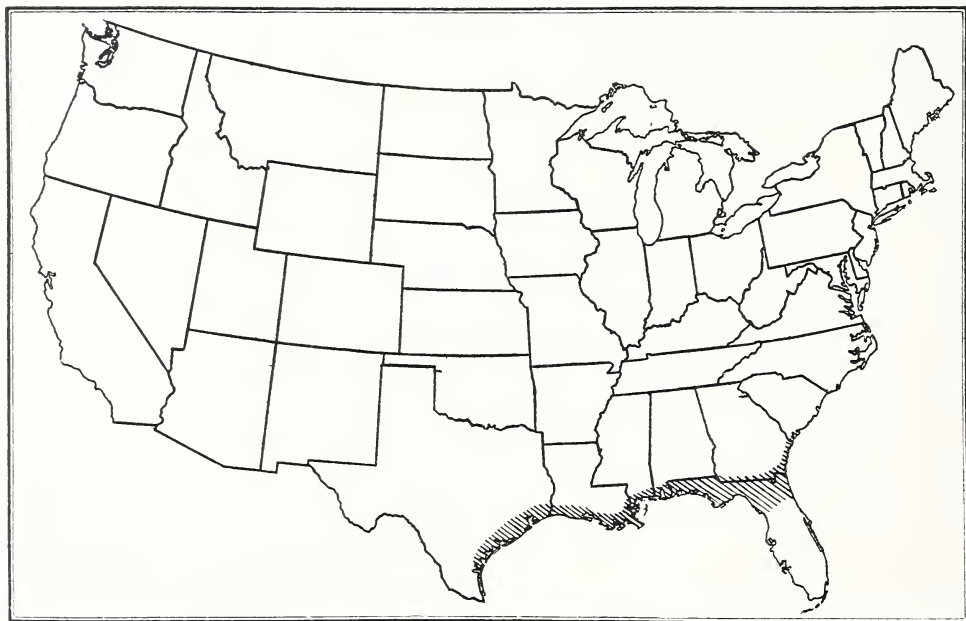


OWARI SATSUMA ORANGES

## GLEN SAINT MARY NURSERIES COMPANY

THE LARGEST GROWERS OF CITRUS TREES IN THE WORLD

GLEN SAINT MARY, FLORIDA



The shaded area in the Southern States marks the region in which Satsuma Oranges may be grown

ESTABLISHED 1882

# Glen Saint Mary Nurseries Co.



*Main Nursery and Office: Glen Saint Mary, Florida*

BRANCH NURSERIES AND OFFICE: CHIPLEY, FLORIDA

## The Satsuma Orange



HE Satsuma Orange, in the opinion of many, is the most profitable fruit that can be grown in northern and western Florida. Moreover, it is the one fruit that can be grown in this territory better than it can anywhere else in the United States, excepting a narrow belt along the Gulf Coast, i. e., the extreme southern portions of Alabama, Mississippi, Louisiana, the Gulf Coast of Texas, and in Georgia along the Atlantic Seaboard as far north as Savannah. In these regions the soil and climatic conditions are very similar to those found in northern and western Florida and the Satsuma seems to be equally at home.

The Satsuma Orange cannot be generally grown in southern Florida (the home of the round orange and grapefruit) because it does not succeed on the high, dry, sandy soils predominating in that section and because the farther south it is planted the later the skin is in coloring and usually the fruit is not so good in quality. It cannot be grown in the citrus-producing section of the Rio Grande valley in Texas as it will not succeed on Sour Orange stock, the only stock adapted to that region. Neither can it be grown much north of the boundary-line between Florida and Georgia, except along the Atlantic, because of the danger of freezing.

The Satsuma is supposed to have originated on the Island of Kiusiu, in Japan, and was first introduced into the United States in Florida in the year of 1876 by Dr. George R. Hall, and again in 1878 by Gen. Van Valkenburg, then United States Minister to Japan.

In 1886, Mr. G. L. Taber, the founder of the Glen Saint Mary Nurseries Company, and at that time its proprietor, had an opportunity of noting and testing the comparative growth and qualities of the Satsuma. Mr. Taber was so impressed with its value that he immediately secured bud-wood and commenced propagating it. Since that time we have always grown Satsumas, both nursery stock and fruiting trees, and in the fall of 1905 we shipped what we believe was the first solid carload of Satsuma





A portion of our original 7½-acre Satsuma grove—five years after planting

fruit ever marketed in America. From 1905 to 1920, from 7½ acres of grove, we shipped a total of 19,399 half-straps. These 19,399 half-straps netted us the sum of \$32,455.68 above transportation and selling expense, or an average of \$3.35 per strap. The fruit consumed on the premises and that sold locally or in bulk is not included in the above figures. It must also be remembered that at the time shipments commenced, the Satsuma was new and totally unknown in the American markets. Since the market has become established, prices have ruled considerably higher and in more recent years we have had our Satsuma fruit sell for as much as \$12 per strap.

During the great World War, owing to the impossibility of securing labor, our Satsuma grove was badly neglected. The trees became impoverished and in their weakened condition they were injured by a cold snap. The low vitality of the trees, together with the damage from the cold, decided us against trying to rejuvenate the grove and, with the exception of a few of the best trees, the entire planting was dug up and destroyed. The trees left standing bore light crops for a few years and have carried very heavy crops the past two seasons.

Notwithstanding the fact that this planting was destroyed in its prime, it had already paid splendid dividends and we immediately started in to replant. At the present time we have in excess of 50 acres of young grove coming on, and it is our intention to add to this materially from time to time.

## Owari Satsuma

For many years it was believed that there was but one Satsuma Orange. The investigations of Dr. T. Tanaka, however, have shown that in Japan there are at least a half-dozen well-marked varieties, with still others showing minor distinctions. A careful investigation of Satsuma orchards has been made in America by Dr. Tanaka and Mr. Leo B. Scott, of the United States Department of Agriculture. They found that three strains of Satsuma, viz., Owari, Ikeda, and Zairai, have been unknowingly mixed together, propagated, sold, and planted. The result in many bearing orchards is most unsatisfactory, as the resulting crops are not uniform in size, quality, or time of ripening.

When the propagation of the Satsuma was undertaken by the Glen Saint Mary Nurseries (trees were first offered for sale in 1888) but one single introduction was made. To this single introduction all our subsequent propagations trace back. Orchards planted with Glen Saint Mary trees throughout the Gulf Coast country became noted for the fine, large, uniform, early-maturing crops of fruit they produced. An investigation made by Dr. Tanaka and Mr. Scott has shown that our trees in orchard and nursery consist of a pure strain, Owari Satsuma. This is the variety most commonly grown in Japan, where it has practically supplanted other strains. Through all these years—more than thirty-eight, to be exact—this is the variety we have furnished our customers. This is so as the direct result of our policy of line propagation, beginning with a definite specimen of known worth. The fruits of Owari Satsuma are large, flattened, depressed at both stem and blossom end, deep orange in color, with thin, smooth rind, which may be separated from the pulp with the fingers without breaking the sections into which the fruit is divided, and nearly or quite seedless.



Citrus trifoliata seed-beds



No citrus fruit that we know of surpasses a well-grown, well-ripened fruit of Owari Satsuma from our orchards.

The Owari Satsuma is the earliest to ripen of all edible oranges commonly grown in America, and is at its best in October and November. It is really fine eating during the latter part of September but seldom marketed then because the skin is not colored. It should be picked and shipped as soon as it colors. At that time the California Valencia season is over and the early round oranges from southern Florida are just beginning to move. There is very little competition and the fruit sells at top prices.

In 1924, the Development Department of the Seaboard Air Line Railway made a very careful survey of the entire Satsuma district and published a booklet on the Satsuma Orange. From this booklet we quote the conclusions reached by them concerning yields and prices, as follows:

Yields are affected by various factors, such as fertility of soil, age and condition of trees, care and attention given. Yields obtained from a grove poorly cared for are no criterion for a grove that has been given proper attention, and *vice-versa*. In 1923, on one western Florida grove of 2 acres, trees twelve years old, a yield of 1,200 half-straps was obtained, or 600 half-straps per acre. At \$3 per half-strap the gross return was \$1,800 per acre. This probably represents the average return to be expected from a twelve-year old grove that has been well cared for. On a farm near Savannah, Ga., in 1923, several six-year-old trees yielded an average of four half-straps per tree. Valued at \$3 per half-strap (a conservative price) the returns would be \$12 per tree.

Based on average production, the following yields may be expected from well-cared-for trees at the ages indicated:

4th year	. . . . .	one half-strap per tree
5th year	. . . . .	two half-straps per tree
6th year	. . . . .	three half-straps per tree
8th year	. . . . .	six half-straps per tree
12th year	. . . . .	ten half-straps per tree

Since the passage of the "Florida Green Fruit Law" by the 1925 session of the Florida Legislature, the movement of early round oranges from Florida has been retarded. The fruit must be held on the trees until it is sufficiently matured to meet the state's requirements. This law does not apply to the "Kid-glove" varieties (Satsuma, Tangerine, King, Mandarin and Temple), and is bound to greatly stimulate the demand for the Satsuma and to increase the prices accordingly.

### Danger from Cold

Wherever citrus trees are grown in the United States there is always the possibility of injury by cold, and the Satsuma is no exception to the rule. It is, however, much hardier than other varieties, and its natural hardiness is greatly increased by budding it on *Citrus trifoliata* stock—the only stock to which it is adapted. The actual danger to the Satsuma in northern and western Florida is probably about the same as it is to the round orange and grapefruit over a great portion of the orange belt.





One-year Satsuma Nursery trees

It is true that in the past the Satsuma has suffered more in this respect than has either the round orange or the grapefruit, but it is equally true that the reasons for it are manifest and, for the most part, could have been avoided. For instance, if the orange and grapefruit groves of southern Florida had been handled, or rather mis-handled, like the Satsuma trees in the northern part of the state, the losses would probably have been quite as heavy. The Satsuma being adapted to territory where oranges had not previously been grown, the planters themselves were generally unfamiliar with the various phases of orange-growing. The knowledge of what to do and what not to do had to be gained by actual experience. Out of this experience some valuable lessons have been learned and now the growing of the Satsuma commercially is considered safe and profitable.

Following are some pertinent practices that experience has shown should be carefully followed to protect the trees from cold:

(1) Select a site for the grove that has fairly moist soil and reasonably good air-drainage. Level lands and the tops and slopes of hills are excellent. Avoid hollows or depressions where cold air is likely to collect and stop circulating.

(2) Plow under all dead cover crops, weeds, or grass the latter part of October or by the middle of November at latest. If they are not dead, make them so by running a disc harrow or mowing-machine over them. Do not plow under a heavy growth of green material. If the surface of the ground is clean and bare, the trees will stand several degrees more cold than they will if the ground is grown up in vegetation where the air cannot circulate freely.

(3) Keep the trees clean and thrifty. A heavy infestation of scale or other insects or disease will so weaken a tree that it will be killed by an ordinary cold snap that would not even injure a tree of strong vitality.

(4) Fertilize only with commercial fertilizer and cover crops. Avoid stable manure; its use is likely to cause the trees to go into the winter in a soft, sappy, or growing

condition, and they will be injured when a tree properly fertilized and hardened up would not be hurt.

(5) Bank the trees with clean soil (free from decaying wood, weeds, or trash) to a height of 1 to 2 feet above the surface. No cold that ever comes to Florida is severe enough to kill that portion of the tree covered with earth. This should be done in late November, early December, or at the first signs of approaching cold. From time to time during the winter the banks should be examined and if pockets have formed about the trunks (caused by the swaying of the tops of the trees) these pockets should be filled up with earth. About the first of March the banks should be removed.

(6) Allow the trees to branch low. The denser the head and foliage and the nearer the branches and foliage come to the ground the better will be the natural protection. The trunk is the most vital part of a Satsuma tree, and every advantage should be taken of the means nature has provided for protecting it. When the trunk is left unprotected and exposed to direct rays of the sun on the morning following a freeze, the rapid thawing of frozen bark will result in splitting and loosening that bark. If, at the end of a few years, you have a tree the trunk of which cannot be found except by lying flat on your stomach and peering for it through the branches, a severe freeze might take off a few of the outside twigs and smaller branches, but the trunk and larger limbs would probably remain intact. The dense foliage and branches will protect it like a blanket.

(7) Pick and ship the fruit soon after it is matured and well colored. If the fruit is allowed to remain too long the vitality of the tree will be drawn on to support it and the tree will become weakened and more subject to cold injury; and it will also produce less fruit the following season.

If the grower will carefully follow the above suggestions, no other precautions will likely be needed in the warmer parts of the Satsuma belt. In the colder portions it will be sufficient for several years, but after the trees have attained some age and are bearing it may be advisable to give additional protection. There are several ways of protecting the trees, but perhaps the most effective and economical is by the use of the coke heaters which are used in many of the groves in southern Florida. Full details concerning cost and operation of these heaters can be had from the manufacturers.

## Soils

The Satsuma Orange, on *Citrus trifoliata* stock, may be successfully grown on soils of many different kinds. Healthy, vigorous trees can be brought into bearing on alluvial lands, clay lands, and sandy lands underlaid with clay. Preferably, the clay subsoil of sandy soils should be fairly close to the surface, that is, within 12 to 30 inches. Usually, lands which will grow good corn, cotton, or peanuts will also grow good Satsumas. The essential requirement is that any land to be used for Satsuma Oranges should be well supplied with water, either naturally or by irrigation. It is also necessary that the soil be well filled with vegetable matter and that its humus content be maintained at a high level. This can be done by growing crops of cowpeas, velvet beans, or beggarweed, and plowing them under when matured.

## Preparation of Land

The land on which Satsumas are to be set should be thoroughly prepared. If the land has previously been in cultivation, it should be plowed and harrowed. If it is new land, all trees, stumps, roots, etc., should be removed before the ground is plowed. It is easier to put the ground in good condition before planting than after, and if the trees are to bring the results desired, it must be done at some time. It is best to cultivate the land a year in advance of planting by growing a crop of cowpeas or velvet beans and turning it back into the soil. Good results may be secured without this, but it is a good plan to follow whenever possible.

## Trees

The trees are the foundation upon which everything else depends. No matter how good the land may be, how well it is prepared, and how much time and effort is spent on it, one cannot make a good grove without planting good trees. A tree that has been budded in the seed-bed, or budded on a poor or stunted transplanted seedling, or has been neglected or improperly handled after budding, will grow more slowly, take longer to come into bearing, and produce much lighter crops for years after it commences to bear. Needless to say, such trees should never be set in grove. They are doomed to be a disappointment and the planter who buys them because they are offered at low prices will not be long in discovering that he has been "Penny-wise and pound-foolish" to purchase them at all.

Our long experience in growing the Satsuma has thoroughly convinced us that a first-class tree cannot be produced in less than three years from the time the seeds are started. The seedlings must be grown for one year in the seed-bed, taken up, graded, root-pruned, transplanted in the nursery rows, and grown on for another year before they are budded. After budding, they must have very careful attention and have it at the times they need it. They must be cultivated regularly, fertilized, stake-trained, and headed back. Every Glen Saint Mary tree



Poor and good one-year trees for planting





Two-year Satsuma trees in nursery

is so handled, and this is one of the reasons why trees from our nurseries enjoy such an enviable reputation.

So far as making a first-class, heavy-producing grove is concerned, the actual size or age of the tree used is not important—provided it has had one full season's bud-growth, has a good root system, and is well-grown and thrifty for its age. Trees which are one, two, or three years old from the time the buds were inserted will all transplant readily and all grow off well, and usually all three sizes will produce fruit the second or third year after planting, if they are allowed to do so. The advantage in using the larger trees is that they will produce more fruit each season until maturity and will, of course, reach full fruiting capacity a year or two years sooner. Not only does the planter receive more fruit in a given time after the larger trees are planted, but he also saves all expense of one or two years' cultivation and, incidentally, the sale value of his grove is considerably higher than if he had planted younger trees. In all development projects and in all private plantings, where the ground is to be given exclusively to the trees and to cover crops, it will be found more economical to use the largest trees available. Where inter-cropping is practiced, and the trees receive their cultivation when the crops grown in the spaces between the tree-rows are cultivated, it is perhaps the cheapest plan to use well-grown one-year trees. The age of the trees alone, however, is not always an indication of their value.



## Distance Apart and Number of Trees per Acre

The Satsuma is a dwarf-growing tree and does not require as much space for proper development as does the round orange. Our own experience and observations have convinced us that a distance of from 20 by 20 feet up to 25 by 25 feet is ample for any type of soil found in the Satsuma belt. On most of the lands in northern and western Florida we would recommend setting the trees 20 by 20 feet, or 20 by 22 feet, or 22 by 22 feet. On lands which are naturally very fertile and on which the trees may be expected to exceed normal growth it may be advisable to increase the distance to 22 by 24 feet, or 24 by 24 feet, or even 25 by 25 feet.

The number of trees required per acre may vary somewhat with the shape of the piece of land, but the following table is as nearly accurate as it is possible to make it:

20 by 20 feet	108 trees to the acre
20 by 22 feet	99 trees to the acre
22 by 22 feet	90 trees to the acre
22 by 24 feet	82 trees to the acre
24 by 24 feet	76 trees to the acre
25 by 25 feet	69 trees to the acre

## Planting

Satsuma trees may be planted at any time of the year when there is sufficient moisture in the ground, but a better stand of living trees will be obtained and the trees will grow off better if they are set during their dormant or resting period, *viz.*, between the latter part of November and the first of April.

After the land has been well plowed and harrowed, a stake 3 to 4 feet tall should be set where each tree is to stand. This staking should be carefully done so that the trees will be in a straight line and check at any angle from which the grove is viewed.

The holes should be dug just in advance of planting to prevent loss of moisture, and they should be about 6 inches wider and deeper than necessary to accommodate the roots. Place the top soil in a pile by itself, mix with it  $\frac{1}{2}$  to 1 pound of raw ground bone, and use this mixture in filling in around the roots. If the ground bone is not available, commercial fertilizer may be used at the rate of  $\frac{1}{4}$  to  $\frac{1}{2}$  pound per tree. Commercial fertilizer must be thoroughly mixed with the soil, however, or there will be danger of its coming in contact with the roots and injuring them.

The trees must not be permitted to lie around with the roots exposed to sun and wind. A few minutes exposure will dry them out and completely ruin them. Keep them covered with moist earth or damp burlap until they are placed in the ground.

Set the trees at the same depth, or not quite so deep, as they stood in the nursery. This can be determined by the earth-marks or "collar" around the tree, which is usually 1 to 2 inches below the point of union between the stock and the bud. If the trees are set too shallow, it is an easy matter to throw the dirt up to them, but if set too deep it is difficult to raise them or to work the dirt away. To get the trees at a uniform depth and to make sure that each stands where the stake indicated it was to go, a Planting-Board will be found very useful. (See illustration on page 13.) Spread out the

Cultivation of the young grove should begin in spring as soon as weeds and grass appear. A disc harrow is the principal cultivating tool. It should be run over the ground often enough to keep all weeds and grass down and to preserve a dust-mulch when the weather is dry. About the middle of June or first of July the ground should be seeded to a cover crop of beggar weed or cowpeas and cultivation discontinued, except a narrow strip 3 to 5 feet wide on each side of the tree rows. These strips should continue to be cultivated until August. Between October 15 and November 15, the cover crop should be turned into the land with a bottom plow and the ground harrowed smooth. No further cultivation will be needed until spring.

In fertilizing Satsumas, only commercial fertilizer should be used. A product analyzing about 4 per cent ammonia, 6 to 8 per cent phosphoric acid, and 4 to 6 per cent potash is excellent. As the trees grow older the amount of ammonia may be slightly reduced and the amount of potash increased, although good results may be had from this same formula right on after the trees come into bearing.

The best practice in northern and western Florida is to apply the fertilizer in two applications—the first early in March and the second between the first and middle of June. In most soils the following amounts will be found about right:

1st year, 2 lbs. per tree . . . . .	1 lb. at each application
2d year, 4 lbs. per tree . . . . .	2 lbs. at each application
3d year, 6 lbs. per tree . . . . .	3 lbs. at each application
4th year, 8 lbs. per tree . . . . .	4 lbs. at each application
5th year, 10 lbs. per tree . . . . .	5 lbs. at each application

and so on at the rate of 2 pounds additional per tree for each year of growth until trees have reached full size. If the trees were transplanted late in the season, and they were fertilized when set, the first application may be omitted.

No spraying will be necessary until disease or insects appear, which may be several years after the trees are planted. The most troublesome insects are the citrus white



Using a planting-board to set a Satsuma tree

fly and the purple scale. Both are controlled by spraying with oil emulsion or whale-oil soap. About the only fungous disease which bothers the Satsuma is citrus scab. It is seldom troublesome and it can be controlled by spraying with bordeaux mixture. All of the above materials can be purchased ready prepared, and with directions for using, from most of the larger fertilizer companies operating in Florida. A barrel sprayer, costing about \$35, and a mule and wagon is all of the spraying equipment that will be needed for years.

### Inter-Planting and Inter-Cropping

Inter-planting, or the planting of other kinds of fruit trees between the Satsumas, is not a bad practice, provided the planter will select quick-growing and short-lived trees for the purpose. Peaches, plums, and even persimmons are suitable and they are not likely to interfere with the Satsumas. They will have outlived their usefulness and be ready to be dug out before the Satsumas will need all of the ground. No long-lived tree, however, such as pecans or pears, should be set in a Satsuma grove, as the grower usually postpones taking them out until he suddenly discovers that the Satsumas and the inter-planted trees have both been seriously injured—one by the other.

Inter-cropping, or the growing of farm crops and vegetables between the rows of Satsumas is not usually recommended. Rightly handled, however, it can be done with little or no injury to the trees and the cost of bringing the grove into bearing will be greatly reduced. Only the middles should be planted, leaving a strip at least 4 to 6 feet wide on each side of the tree-rows. These strips may be cultivated with a harrow or they may be plowed and cultivated as though the trees were a row of produce. Watermelons, sugar-cane, and sweet potatoes are not good crops to plant in a Satsuma grove.





Satsuma orchard—15 months after planting

## Conclusion

As in the case of other farm enterprises, the success attained with the Satsuma is in direct proportion to the intelligent care and foresight exercised by the grower. The Satsuma is not a fruit to be planted and forgotten or to be cared for in a slipshod, haphazard sort of fashion. It must have the same careful attention that the good farmer is in the habit of giving to ordinary field crops. Planted in suitable soils and properly handled, it will succeed and it will yield more clear profit per acre than any other crop with which we are acquainted.

The future prosperity of northern and western Florida, without doubt, rests in its soil—its horticulture and agriculture. At the present time there is every indication that this section is on the threshold of an era of the greatest development it has ever known, and there is a widespread disposition to get down to business and develop its resources on a solid and substantial basis. The Satsuma is destined to play the leading rôle in this development, just as the round orange has done in the development of southern Florida.

## The Cultivation of Citrus Fruits

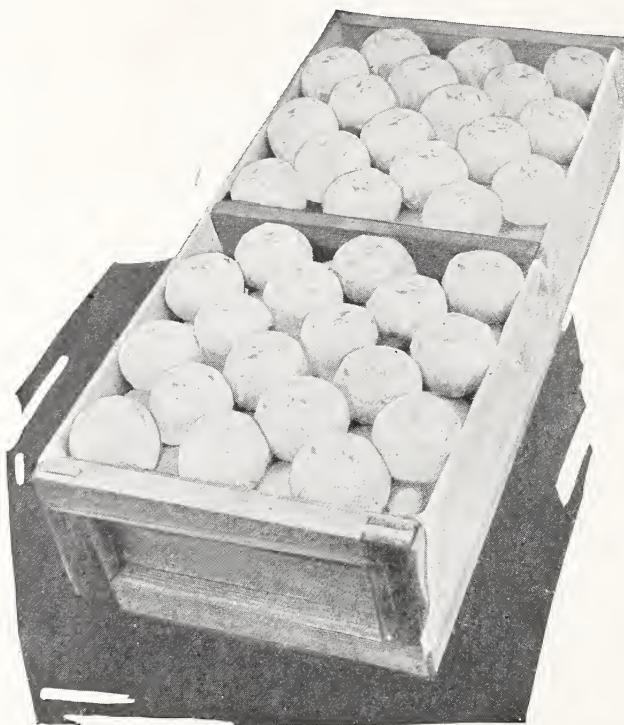
By H. HAROLD HUME

This new citrus book covers all phases of citrus fruit-growing. It deals exhaustively with varieties, propagation, nursery practices, planting, fertilizing, pruning, and frost protection. It covers the details of orchard management and harvesting and marketing the crop. Insects and diseases are described and methods for their control are discussed. It contains 561 pages and 237 illustrations from drawings and photographs. Price, \$5 per copy, postpaid.





G. L. Taber and one of the original Owari Satsuma trees at Glen Saint Mary



HALF-STRAP OF SATSUMA ORANGES

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